Message

From: Dan Pope [DPope@css-inc.com]
Sent: 9/15/2017 2:15:14 PM
To: Davis, Eva [Davis.Eva@epa.gov]; d'Almeida, Carolyn K. [dAlmeida.Carolyn@epa.gov]; 'Cosler, Doug' [Doug.Cosler@TechLawInc.com]; Bo Stewart [Bo@Praxis-Enviro.com]; Wayne Miller (Miller.Wayne@azdeq.gov) [Miller.Wayne@azdeq.gov]
CC: Henning, Loren [Henning.Loren@epa.gov]; Fairbanks, Brianna [Fairbanks.Brianna@epa.gov]
Subject: RE: 2017-9-12 - WAFB - Praxis evaluation of Amec 8-16-2017 review – Praxis Time of Remediation TOR memo 5-30-2017 - EBR ST012 - FPU18-045 - epa

The Praxis evaluation statements (as far as I understand them, anyway) are a good reiteration, with more technical detail, of course, of many of the things we've been saying all along.

That is, if the LNAPL at the site were uniformly distributed (little globules of LNAPL with lots of surface area per unit mass of LNAPL, and lots of space around each globule of LNAPL for groundwater to flow all around each globule), as the AMEC approach/modeling assumes to greater or lesser degrees, then:

1) sulfate/nutrients could be readily delivered all around each LNAPL globule so that sulfate/nutrients are not limiting factors for biodegradation, and
2) COCs would readily move out of the LNAPL to groundwater (and therefore be available for biodegradation by the groundwater-dwelling microbes), because the diffusion path of the COCs from within the LNAPL globule to groundwater is short.

However, if that assumed distribution of LNAPL were correct, then P&T would work well, because P&T is doing the same thing as EBR (that is, carrying away the COCs for extraction as soon as the COCs move from the LNAPL into groundwater, and of course creating/maintaining a high gradient of COC concentration from LNAPL to groundwater).

However, P&T did not work, as acknowledged by all. Also, I suspect (I haven't read all the old site documents) that the rationale given for why P&T didn't work and should be abandoned is essentially that the small-globule-well-distributed idea of LNAPL distribution is not actually the case at the site. And if the small-globule-well-distributed idea of LNAPL distribution is not actually the case at the site, then the AMEC TOR predictions are likely to be highly optimistic.

Note also that Praxis reiterates the point that the sampling locations and statistical treatment of performance monitoring data is paramount (item 3). There's a big difference between:

1) remediating until the overall site groundwater COC concentration mean across all sampling locations is MCL or below, or
2) remediating until the groundwater COC concentration at each and every sampling location is MCL or below.

Note that Praxis points out the change in limiting factors, once sulfate is well-distributed.

That is, if there's plenty of sulfate and nutrients all around the little globules of LNAPL, then the mass transfer of COCs from the LNAPL to groundwater (so as to be available for degradation by the groundwater-dwelling microorganisms) is probably the limiting factor for degradation and remediation.

Obviously then the assumptions about LNAPL distribution, COC gradients from LNAPL to groundwater, COC diffusion path lengths in the LNAPL, etc. become the major factors affecting the predictions of TOR. But it's exactly those assumptions that are major factors in the differences between our TOR predictions and AMEC's TOR predictions.

That is, AMEC appears to hold (at least implicitly) that the small-globule-well-distributed idea of LNAPL distribution at the site is generally true, whereas we hold that the small-globule-well-distributed idea of LNAPL distribution is not generally true, or at least not true enough to allow EBR to proceed as successfully at AMEC claims.

We hold that significant amounts of the LNAPL at the site are distributed in large masses, with some perhaps in low permeability zones, so that:

1) effective distribution of sulfate/nutrients to the large masses is problematic, and
2) transfer of COCs from the large masses of LNAPL to groundwater is problematic because the diffusion path length from the interior of the LNAPL masses to groundwater is long.

Praxis writes many other useful things in their evaluation, but the ones I summarized above are ones that stand out for me.

From: d'Almeida, Carolyn K.
Sent: Wednesday, September 13, 2017 5:27 PM
To: Davis, Eva <Davis.Eva@epa.gov>; 'Dan Pope' <DPope@css-inc.com>; 'Cosler, Doug' <Doug.Cosler@TechLawInc.com>
Subject: FW: 2017-9-12 - WAFB - Praxis evaluation of Amec 8-16-2017 review – Praxis Time of Remediation TOR memo 5-30-2017 - EBR ST012 - FPU18-045 - epa

Fyi – Bo's comments on the RTCs to the TOR memo

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"Because a waste is a terrible thing to mind…"

From: Wayne Miller [mailto:Miller.Wayne@azdeq.gov]
Sent: Tuesday, September 12, 2017 4:58 PM
To: d'Almeida, Carolyn K. <dAlmeida.Carolyn@epa.gov>
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Subject: 2017-9-12 - WAFB - Praxis evaluation of Amec 8-16-2017 review – Praxis Time of Remediation TOR memo 5-30-2017 - EBR ST012 - FPU18-045 - epa

For your use -

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